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# ANOMALOUS ABSORPTION

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Principal Investigator

## MANAGEMENT REPORT

1 January 1981 thru 31 March 1981

Sponsored by  
Advanced Research Projects Agency  
ARPA Order Number 220  
Program Code Number NR 006-120

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Administered by the Office of Naval Research  
Contract N00014-80-C-0091

Contract Effective Date: 1 October 1979  
Contract Expiration Date: 30 September 1981  
Amount of Anomalous Absorption Contract: \$434,299

Scientific Officer: Director, Acoustic Program  
Office of Naval Research  
Department of the Navy  
800 North Quincy  
Arlington, Virginia 22217

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of the Scripps Institution of Oceanography

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  The primary objective of the Anomalous Absorption program is to observe and correlate in a quantitative manner the anomalous, frequency dependent acoustic absorption caused by fish and fish larvae with the type and abundance of the fish and larvae population as determined by net hauls. Such a characterization of the absorption will allow tactical sonar performance prediction to draw on fisheries surveys of regional productivity		

as a data bank for prediction of anomalous absorption in the mobile passive sonar band. Cooperative support has been offered by the National Bureau of Fisheries for the program by way of ship time on the DAVID STAR JORDAN for deploying and recovering the buoy systems and in collecting and supplying net haul data at the buoy stations during the data collection period. The scope of the program includes the design, fabrication and testing of the automatic data collection buoy system in the first year, followed by a two year program of data collection in the southern California current.



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Marine Physical Laboratory

ANOMALOUS ABSORPTION

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1 January 1981 thru 31 March 1981

RESEARCH PROGRAM AND PLAN

The primary objective of the Anomalous Absorption program is to correlate in a quantitative manner the anomalous frequency dependent acoustic absorption caused by fish and fish larvae with the type and abundance of the fish and larvae population as determined by net hauls. Such a characterization of the absorption will allow tactical sonar performance prediction to draw on fisheries surveys of regional productivity as a data bank for prediction of anomalous absorption in the mobile passive sonar band. Cooperative support has been offered by the National Bureau of Fisheries for the program by way of ship time on the DAVID STARR JORDAN for deploying and recovering the acoustic buoy systems and in collecting and supplying net haul data at the buoy stations during the data collection period. The scope of the program includes the design, fabrication and testing of the automatic data collection buoy system in the first year, followed by a two year program of data collection in the southern California current.

MAJOR ACCOMPLISHMENTS

A full buoy set has been fabricated and is undergoing final checkout in preparation for deployment in the next quarter. This set includes one transmitter, two receivers, and four transponder/release units, along with the associated transducers, floats, lines, and anchors. A spare receiver and a spare transponder/release unit, with transducers, are also ready. A spare transmitter is expected to be ready in time for the deployment.

Fabrication of the electronics for the second and third buoy sets is continuing, and is still expected to be completed during the remainder of FY 81. Altogether, the three buoy sets will include ten receivers (three per set,

(one spare), four transmitters (including one spare), and 13 transponder/release units (four per set plus a spare). The present status of the various items is detailed in the following paragraphs.

Receivers (10 required): Electronics fabrication is complete for two units. The second transmitter is being checked out. Battery pack parts have been fabricated for all four units, and two packs have been assembled. All electronic parts are in hand. Pressure cases for all four units are finished.

Transponders (13 required): Five units are complete and tested. A modified printed circuit board layout, incorporating changes needed for close range operation, is complete but has not been tested. Electronic parts for the remaining eight units are 80% in hand. This includes 100% of the required transformers and other long-lead-time items.

Transducers: Four out of ten receiver hydrophone strings, two of four transmitter transducer sets, and nine of thirteen transponder transducers are complete. All parts and materials for the remainder are on hand, and production is proceeding without problems. Two towed transducers for the shipboard command and ranging system have been finished.

The basic receiver system software has been written and tested using the input signal simulator mentioned in the previous quarterly report. It is able to correctly synchronize with the transmitter and to track the received signal arrival time. The problem encountered in the AGC program during the deployment last August has been corrected. Several subtle hardware problems have been identified and corrected in the process of software checkout. Continuing effort is being directed at verifying that the system responds properly to unusual conditions, such as a dead or noisy input channel.

## FUTURE PLANS

We have had to expend more effort than was planned on several aspects of the design and fabrication program. In particular, software development time and shop costs have been greater than expected. As a result, plans for the remainder of FY 81 have had to be limited in three ways:

1. Only one deployment is planned. This will be in early May, with recovery 20 to 30 days later, depending on the ship schedule. The next deployment will be scheduled for October.
2. Orders for four 13 inch flotation spheres, and the Kevlar line required to ready the second and third buoy sets for deployment and are being delayed. They will be ordered for delivery in October.
3. Software development and hardware fabrication for the surface acoustic link have been deferred.

Fabrication and checkout of the second and third buoy sets is still proceeding according to schedule. Software for data validation and preliminary analysis

is being written, and will be tested and refined using the data recorded in the May deployment.

FISCAL STATUS

(1) Amount currently provided in contract

\$434,299

(2) Expenditures and commitments to date

\$410,500

(3) Estimated funds required to complete the work

\$23,799

(4) Estimated date of completion of work

30 September 1981

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